MOBILE EXPERTS

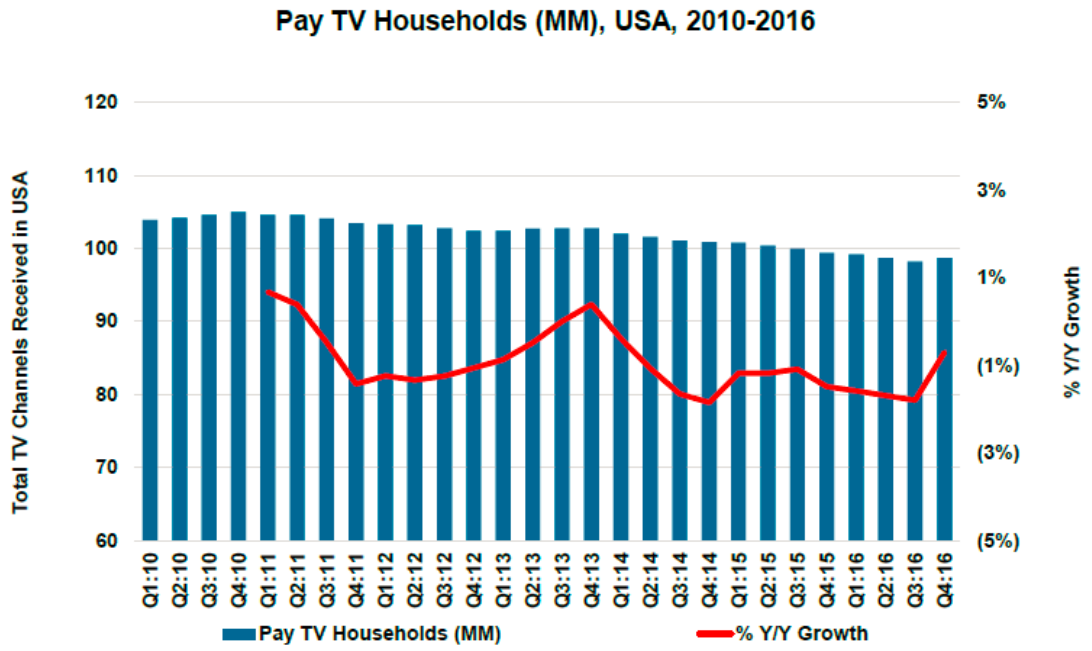
EXPERT INSIGHT FOR RAN and In-Building Wireless Subscribers

Mobility Premium:

How will it change in a 5G world?

Introduction – Changing Telecom Landscape and Consumer Preferences

Our earlier *Expert INSIGHT* explored the 5G convergence of telecommunication and media entertainment.[1] As service providers increasingly face commoditization effects of connectivity services, especially on the mobile connectivity side as compared to fixed (cable) access, they are looking beyond simple connectivity services to media and other value-added services. Comcast's NBC Universal acquisition back in 2011 has set a precedent, and AT&T is in the process of acquiring Time Warner. These tectonic industry changes are fundamentally driven by changing consumer behavior. As programming costs have increased, and traditional Pay TV distributors passed on the cost, consumers have begun to seek lower-cost, on-demand experiences such as Netflix to augment or replace traditional video packages as data network capabilities have increased tremendously since the dial-up days.



Source: Kleiner Perkins, 2017 Internet Trends

Figure 1. Pay TV households are declining as consumer behaviors change

While the long-term effects of "skinny" bundles such as Netflix, Hulu, and DirecTV Now, on the broad video industry are too early to tell, the changing consumer behavior of watching whatever, whenever, wherever, and on whichever device, is certainly having an impact on traditional video. Fixed and mobile broadband service providers need to consider strategic options in the changing telecommunications landscape.

[1] Mobile Experts' Expert INSIGHT (MEXP-RAN-17-EI1), "5G: The Convergence of Telecom and Entertainment," March 2017.

In terms of broadband business which ultimately controls the transport of communications and media entertainment services, fixed and mobile services are priced very differently. Mobile revenue is often much higher than fixed revenue, relative to the amount of traffic transported over the two network types. While about 90% of consumer internet traffic is transported over fixed (and Wi-Fi) networks, the mobile operators derive far higher connectivity service revenue than the fixed operators.[2] We highlighted this *mobility premium* differential between mobile vs. fixed access a little over a year ago – pegging the mobility premium at 20-60x in the United States and postulated that this *mobility premium* will come down as fixed-mobile convergence trend increases.[3]

In this *Expert INSIGHT*, we take a closer look at this *mobility premium* index and see if it has indeed fallen a year later. In addition, the report highlights the *mobility premium* index trend in the competitive U.S. market as a possible early indicator of convergence of mobile, cable, and media companies. Finally, the report predicts future *mobility premium* levels five years from now, when 5G commercial rollout in major U.S. markets should be in full force. From the 5G outlook, the report highlights possible implications for fixed-mobile competition and the best direction for cable/mobile M&A.

What is Mobility Premium?

Price, by definition, is a gauge of supply and demand. It is a good barometer of how much consumers value a certain product or service (i.e., demand), and cumulative market forces including technology cost and competitive dynamics that impact the overall supply trend. In other words, it provides a good singular measure to view cumulative effects of market forces and consumer demand. Taking the retail service pricing on a $ per GB basis, separate mobile and fixed transport costs (to consumers) are calculated to identify consumer value of transporting a GB of data over mobile vs. fixed networks.

The *mobility premium* index is simply a differential between the fixed and mobile broadband pricings on a per-gigabyte basis. In our analysis, "popular" or least costly "family" plan is used to derive a "per-line" service pricing (including temporary promotional pricing at the time of survey to capture competitive dynamics at play) and divide this per-line retail pricing by data allotment (i.e., a data cap beyond which speed is throttled)[4] and actual usage to capture the "per GB" mobile pricing. Similarly, we identify "popular" high-speed Internet offerings from multiple cable operators and divide the service pricing (typically 12-month promotional pricing) divided by monthly data cap on those plans to arrive at the "per GB" fixed broadband pricing.

[2] Cisco VNI, 2017

[3] FierceWireless, "At $9 per GB, mobile internet is a 20-60x times premium to fixed internet," June 20, 2016

[4] While mobile "unlimited" data plans theoretically do not limit data usage beyond monthly data cap limits, we assume that consumers will view lower-speed experiences to be unacceptable and view data caps as just that.

While respective "$ per GB" trends offer views into competitive dynamic within mobile and fixed broadband markets, the mobility premium index arguably provides a metric to gauge:

1) *Consumer value preference (or indifference) of mobile access over fixed access* – a declining mobility premium index implies that consumers are generally indifferent about mobile access for data transport and that the probability of fixed-mobile convergence and competition is increasing;
2) *Operator stance on "bounded" vs. "all-out" intermodal competition* – an increasing or stable trending of mobility premium index signals that mobile and cable operators are happy with the "bounded" competition whereby mobile operators won't significantly encroach on fixed broadband market, and vice versa;
3) *Propensity of fixed-mobile broadband competition* – the mobility premium index trend towards 1x implies that the chance of intermodal broadband competition is increasing. However, the index needs to be arguably less than 5x to signal a meaningful intermodal competition in certain segments of the market.

Mobile Broadband Pricing Trend

In 2016, the US wireless industry saw fierce competition as T-Mobile and Sprint moved aggressively to capture subscribers away from the top two carriers. In mid-2016, T-Mobile and Sprint effectively offered mobile data pricing as low as $5 per GB based on popular family share plans. Meanwhile, AT&T and Verizon stuck to their incumbent positions and held onto higher data pricing – around $10 per GB. Accounting for relative subscriber relationships, the weighted average mobile data pricing was around $9 per GB in mid-2016.

Mobile Plans (June 2016 survey)	Service Pricing	Data per Line	$ per GB
AT&T			
Individual plan, 2GB LTE	$ 55	2 GB	$27.50
4-line family plan, 15GB LTE share	$160	3.75 GB	**$10.67**
Verizon			
Individual plan, 3GB LTE	$65	3 GB	$21.67
2-line family plan, 6GB LTE share	$100	3 GB	$16.67
4-line family plan, 18GB LTE share	$180	4.5 GB	**$10.00**
T-Mobile			
Individual plan, 6GB LTE	$65	6 GB	$10.83
2-line family plan, 6GB LTE each	$100	6 GB	$8.33
4-line family plan, 6GB LTE each	$120	6 GB	**$5.00**
Sprint			
4-line family plan, 40GB LTE share	$200	10 GB	**$5.00**
Weighted average $ per GB based on Data Allotment			**$8.97**
Weighted average $ per GB based on Usage (assuming 3.7 GB/month)			**$11.42**

Source: Mobile Experts

Notes:
1. Service pricing includes line access fees, unlimited talk and text included in most plans
2. Retail pricing survey conducted on June 9, 2016 based on company websites
3. Lower retention-based pricing may exist but not accounted for in this survey
4. Weighted average figures are calculated based on percentage of each operator's postpaid subscribers to industry total
5. Average data usage of smartphone users in North America is 3.7 GB/month (source: Ericsson Mobility Report)

Figure 2. USA Mobile Retail Pricing in June 2016

As the competition heated up, Verizon and AT&T finally succumbed to "unlimited" data plans from T-Mobile and Sprint, and began to offer their own "unlimited" plans by early 2017. By mid-2017, the competitive pressures drove the industry average pricing down to $1.80 per GB – a five-fold reduction in just one year!

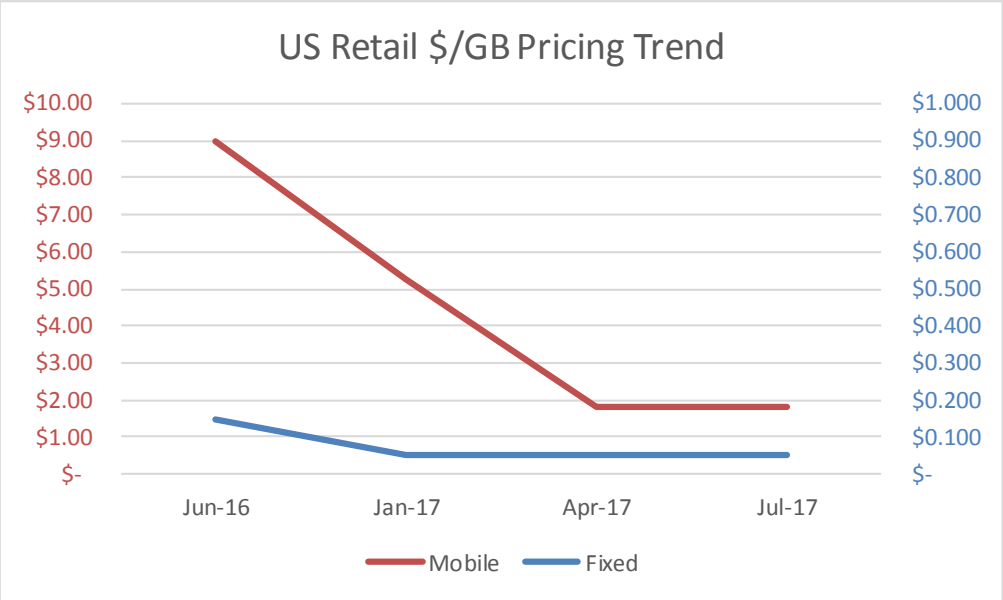
Mobile Plans (July 2017 survey)	Service Pricing	Data per Line	$ per GB
AT&T			
1-line Unlimited PLUS (10GB mobile hotspot)	$ 90	22 GB	$4.09
2-line Unlimited PLUS	$145	22 GB	$3.30
4-line Unlimited PLUS	$185	22 GB	**$2.10**
Verizon			
1-line Unlimited	$80	22 GB	$3.64
2-line Unlimited	$140	22 GB	$3.18
4-line Unlimited	$180	22 GB	**$2.05**
T-Mobile			
1-line T-Mobile ONE (tax & fees included)	$65	32 GB	$2.03
2-line T-Mobile ONE	$90	32 GB	$1.41
4-line T-Mobile ONE	$140	32 GB	**$1.09**
Sprint			
1-line Unlimited	$50	23 GB	$2.17
2-line Unlimited	$90	23 GB	$1.96
4-line Unlimited (3rd – 5th line free promotion)	$90	23 GB	**$0.98**
Weighted average $ per GB based on Data Allotment			**$1.80**
Weighted average $ per GB based on Usage (assuming 6.9 GB/month)			**$5.97**

Source: Mobile Experts

Notes:
1. Service pricing includes line access fees, $5 discount for autopay. Unlimited talk and text included.
2. Retail pricing survey conducted on July 26, 2016 based on company website pricing
3. T-Mobile service pricings reflect estimated $5 discount per line for estimated tax & fee charge for 'like-for-like' comparison
4. Even though all 4 major operators offer "unlimited" plans, the different data cap limits upon which data services are throttled to lower speeds are noted as "Data per Line" in the '$ per GB' calculation
5. Weighted average figures are calculated based on percentage of each operator's postpaid subscribers to industry total
6. Average data usage of smartphone users in North America of 6.9 GB/month (source: Ericsson Mobility Report) is used for "average $/GB based on usage" calculation

Figure 3. USA Mobile Retail Pricing in July 2017

Based on a couple of additional survey data points between mid-2016 and mid-2017 (see Figure 4), we observed stabilization of the market as the top three operators have decided not to respond in kind to Sprint's latest promotions (e.g., "3 to 5 lines free"). Based on record-low postpaid churn rates being reported by the top three operators and relatively stable retail pricings in the first half of 2017, it appears that the industry has reached a steady state – at least for now.



Source: Mobile Experts

Figure 4. USA Mobile Retail Pricing in July 2017

Fixed Broadband Pricing Trend

Unlike the wireless industry, competitive dynamics in the U.S. fixed broadband market have been relatively calm. With non-overlapping franchise geographic footprints, cable operators have been gaining overall fixed broadband market share away from incumbent Telcos for some time. Even though telco investments in fiber have increased in recent years, their primary focus has centered around enhancing backhaul for their wireless businesses and targeting large enterprise customers.

Cable operators' broadband pricing indicates a clear trend towards maintaining their leading broadband market share. Cable operators generally offer faster speed Internet packages (relative to Telcos' DSL offering) in much of their footprint. While maintaining or marginally increasing broadband pricing, the cable operators are able to then upsell a higher speed Internet package and cross-sell Pay TV services. With small incremental costs to increase speed or increase the data cap limit, cable operators are able to capture high-margin broadband revenue while lowering the "$ per GB" unit pricing - to compete effectively against mobile broadband offerings. In mid-2016, based on our survey of popular cable broadband offerings with introductory pricings, the average $ per GB for the fixed broadband industry was $0.15. This is based on the monthly usage limit of 300 GB at that time.

Fixed Broadband Plans (June 2016 survey)	Service Pricing	Monthly Data Cap	$ per GB
Cox			
50Mbps, introductory pricing	$55	300 GB	$0.22
Charter			
60Mbps, Internet only (12-month introductory pricing)	$40	300 GB	$0.13
Comcast			
50Mbps, Internet (introductory pricing)	$45	300 GB	$0.15
Average $ per GB based on Data Allotment			**$0.15**
Average $ per GB based on Usage (assuming 80 GB/month of median usage)			**$0.56**

Source: Mobile Experts

Notes:
1. Retail pricing survey conducted on June 9, 2016 based on company website pricing
2. While some cable operators tout no data cap offering, most had 300GB/month data cap limit upon which additional surcharge is added ($10 per each 50 GB of additional data usage)
3. Median fixed broadband usage figure is an estimate based on Comcast comment on an earnings call

Figure 5. USA Fixed Broadband Retail Pricing in June 2016

While the mobile industry was mired in fierce competition, the cable operators quietly raised the monthly data cap to 1 TB on most broadband plans as the usage ticked up as consumers connected more devices and watched more HD videos at home. Mostly from the arbitrary increase in the data cap limit, the average fixed broadband pricing fell to $0.05 per GB in mid-2017.

Fixed Broadband Plans (July 2017 survey)	Service Pricing	Monthly Data Cap	$ per GB
Cox			
15/2 Mbps (down/up), introductory pricing	$40	1024 GB	$0.04
100/10 Mbps (down/up), introductory pricing	$60	1024 GB	$0.06
Charter			
100 Mbps, Internet only (12-month introductory pricing)	$40	1024 GB	$0.04
Comcast			
55 Mbps, Internet (introductory pricing)	$40	1024 GB	$0.04
100 Mbps, Internet (introductory pricing)	$50	1024 GB	$0.05
Average $ per GB based on Data Allotment			**$0.05**
Average $ per GB based on Usage (assuming 114 GB/month of median usage)			**$0.44**

Source: Mobile Experts

Notes:
1. Retail pricing survey conducted on July 26, 2017 based on company website pricing
2. Most cable broadband offers have 1TB/month data cap upon which additional surcharge is added ($10 per each 50 GB of additional data usage)
3. Comcast reported 88GB/month of median broadband usage at the end of 2016. Assumed 30% increase in July 2017

Figure 6. USA Fixed Broadband Retail Pricing in July 2017

Mobility Premium Trend and Outlook

The *mobility premium* can be calculated in two ways: 1) based on data allotment; and 2) based on actual usage. The *mobility premium based on data allotment* reflects offered service plans in the marketplace, so it can be thought of as an *operator's view* of how consumers value mobile vs. fixed access. Meanwhile, the *mobility premium based on usage* can be viewed as *consumer's view* of how he/she values mobile vs. fixed access based on actual usage.

Mobility Premium based on Data Allotment

As described above, the effects of fierce competition in the mobile industry can be clearly observed in the "$ per GB" unit pricing. In mid 2016, the retail mobile data pricing was, on average, about $9 per GB while the fixed broadband pricing was about $0.15 per GB, yielding 60x *mobility premium.* Put another way, based on service pricing and associated monthly data allotments, data access via mobile is considered 60x more valuable than fixed broadband. Just a year later, in mid-2017, an average mobile data pricing has plummeted to $1.80 per GB as all major operators fiercely competed with "unlimited" offers.[5] Meanwhile, the fixed data pricing, on a '$ per GB' basis, has decreased to $0.05 per GB as major cable operators introduced higher speed Internet plans with larger data cap limits[6] to differentiate fixed connectivity service from mobile broadband services. As a result, the *mobility premium* declined to 37x in mid-2017.

At first glance, the big decline in *mobility premium* in just one year seems to suggest that fixed-mobile convergence seems imminent. However, we believe this is far less certain. The 37x differential between mobile vs. fixed access is still too large of a gap for consumers to substitute mobile for fixed broadband use. While a certain price-sensitive segment of the population is certainly doing just that today[7], a majority of the population in the United States, in our opinion, view the two products differently. Fixed broadband plans are largely viewed as high-speed, uncapped connectivity services while mobile broadband plans are viewed primarily as mobile connectivity services with implicit data caps. While "unlimited" mobile plans are good for smartphone and tethering applications, median broadband households consume more than 100 GB per month today.[8] We believe that most households will not be satisfied with Kbps connectivity links after going over the 22-30 GB limit on mobile broadband plans when they are so accustomed to tens or hundreds of Mbps average throughput link services at home.

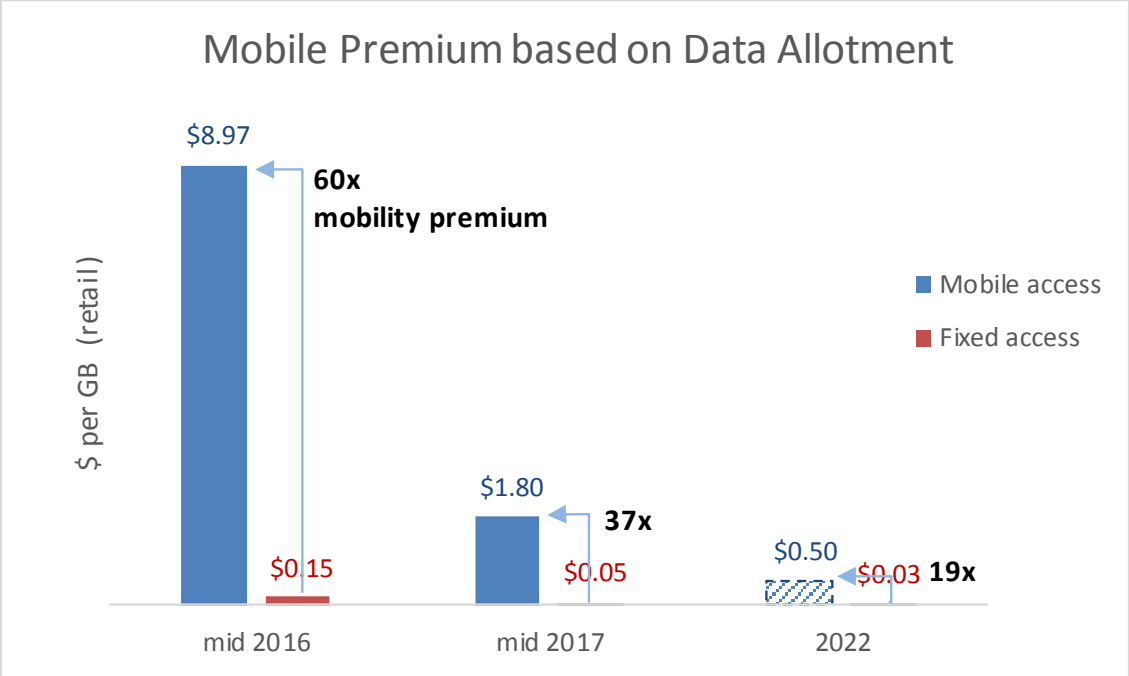
Looking out to the 2022 timeframe, when commercial 5G network services are expected in top US markets, we forecast the mobility premium to continue its declining trend – reaching about 19x in 2022, as the lower unit economics of 5G at both 3.5/4 GHz spectrum and at 28/39 GHz

[5] Fiercewireless, "It looks like unlimited data is here to stay", Jan. 2017
[6] Major cable operators upped the monthly data cap limits from 300 GB per month to 1 TB per month in early 2017
[7] 7% of Americans rely on smartphone for online access (source: Pew Research, 2015)
[8] Comcast reported median broadband usage of 88 GB per month at end of 2016. We estimate the fixed broadband traffic is growing at 40-50% year-over-year.

spectrum bands provide basis for lower mobile retail pricing – reaching $0.50 per GB in 2022. Meanwhile, the fixed broadband pricing is forecasted to reach $0.03 per GB as cable operators continue to expand higher-tier Internet services with higher monthly data caps to differentiate their fixed broadband product from mobile offerings. Some of the key drivers and assumptions for these estimates are as follows:

1) Mobile/Cable industry M&A should result in a more stable industry structure and less competitive pressure for price reductions and promotions;
2) $50 per line mobile service pricing in 2022;
3) "Unlimited" mobile data cap is estimated to be 100 GB per month in 2022;
4) Cable operators will be motivated to continue differentiation of their fixed broadband offerings with higher speed tier offerings and increased data usage caps; and,
5) 1 Gbps fixed broadband offering at $80 introductory pricing with 3 TB monthly usage cap

The mobility premium in 2022 in midst of 5G commercial rollout in major markets is estimated to be 19x. While the mobility premium is expected to continue its downward trend, the premium differential is expected to be maintained and still meaningful enough[9] that wireless substitution (of fixed broadband services with mobile access) is expected to be marginal.



Source: Mobile Experts

Figure 7. Mobility Premium based on Data Allotment - Trend and Outlook

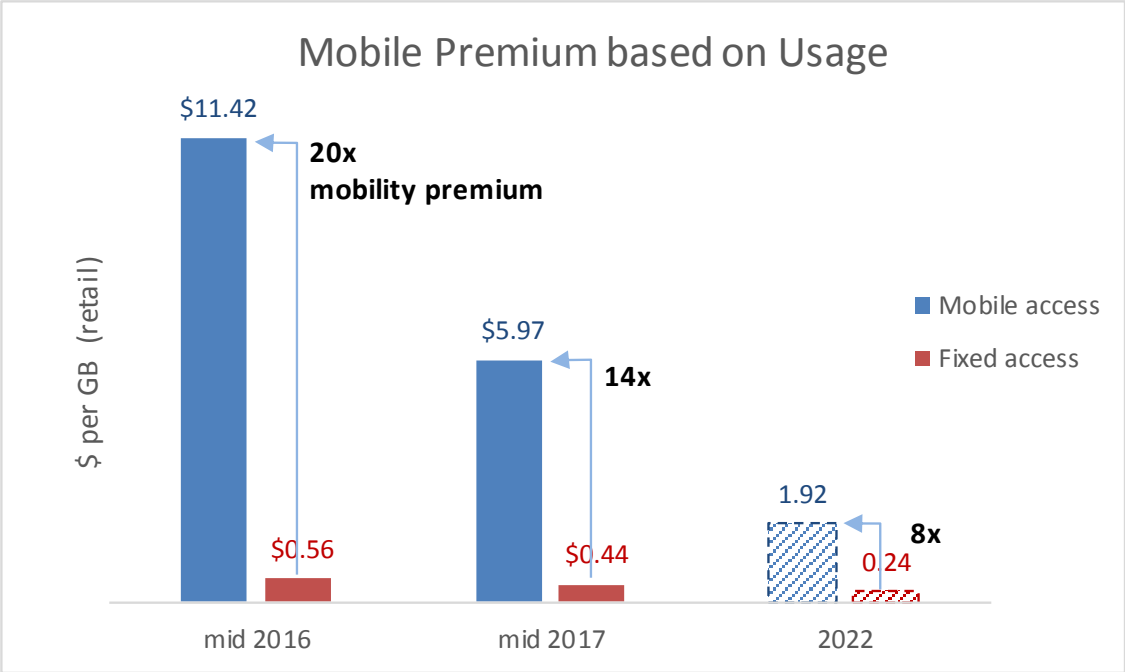
[9] A mobility premium differential of less than 5x may prompt some segment of the market to widely substitute fixed broadband with mobile broadband; thus prompting "all-out" fixed-mobile intermodal competition.

Mobility Premium based on Usage

While the "unlimited" service plans offer large enough monthly data caps for most subscribers who use far less data than allotted, it is helpful to look at the mobility premium based on actual usage as it offers a closer view of the *actual* premium differential and the probability of fixed-mobile convergence and competition assuming that flexible "pay for use" pricing is made available in the marketplace. Translating service pricing based on actual usage rather than data allotment, the mobility premiums for mid-2016, mid-2017, and 2022 estimates are shown in Figure 8. The mobile data usage figures are based on Ericsson Mobility Report estimates and forecasts, and the fixed data usage figures are based on a reported Comcast figure in 2016, extrapolated out to 2017 and 2022. For example, Ericsson reports that an average North American smartphone data usage was 3.7 GB per month in 2016, and is expected to be 6.9 GB per month in 2017, and 26 GB per month in 2022. Meanwhile, Mobile Experts estimates that a median fixed broadband data usage was about 80 GB per month in mid-2016, 114 GB per month in mid-2017, and will reach about 350 GB per month in 2022.

Based on these estimates, the mobility premium based on actual usage was 20x in mid-2016 and declined slightly to about 14x in mid-2017. In 2022-time frame, we estimate the mobility premium based on actual usage to decline to 8x as the line between fixed and mobile access become more blurred, but maintain enough differential to minimize the risk of wireless substitution. As noted in our previous *Expert INSIGHT* report[10], cable operators have a robust technology roadmap including hybrid-fiber coaxial plant upgrades and various technology introductions to increase network capacity along fiber and coaxial portions of cable networks.

[10] Mobile Experts' Expert INSIGHT (MEXP-RAN-17-EI3), "Cable Networks and Small Cells", June 2017.



Source: Mobile Experts

Figure 8. Mobility Premium based on Usage – Trend and Outlook

5G Fixed Wireless: Can it compete with fixed broadband?

Based on early field trials touting performance capabilities of millimeter wave fixed wireless systems[11], Mobile Experts believes that mobile operators can achieve over 1-Gbps links using the 28 GHz millimeter wave band with 800 MHz of bandwidth in direct line-of-sight (LOS) system. For a non-LOS system, the link throughput would be greatly reduced to about 100Mbps at 28GHz. For urban or dense suburban environments, we believe a small cell with 200-300 meter range can be leveraged to offer competitive broadband offering with a millimeter wave fixed wireless system deploying 800MHz of bandwidth. Assuming a massive MIMO antenna array (64T64R or higher), and reasonable assumptions around over-subscription ratio, we believe mobile operators can offer 100Mbps fixed wireless broadband services to about 60 homes in the small cell coverage. For a dense market like Boston, a small cell with a 200-300 meter radius would cover about 300-600 homes. This implies that a millimeter wave fixed wireless system employing 800MHz of bandwidth has enough capacity to penetrate 10-20% of the market with 100Mbps+ broadband offering.

It is reasonable to expect mobile operators to harness a big swath of spectrum in the millimeter wave bands to target incremental opportunities in the fixed broadband market, and at the same

[11] Verizon reported 1.8 Gbps link over 1500 feet in its 28 GHz fixed wireless field testing (VZ investor call, May 2017)

time, leverage such system to use it in "speed" or "capacity" boost scenarios in traffic hotspot locations for mobile services. However, broad deployments of these high-capacity small cells will likely be limited to dense urban locations in the early years of 5G lifecycle. The RF propagation limitations of millimeter wave radios would naturally limit the scope of these systems in dense markets where high-capacity, short-range radios can cover a relatively large base of potential subscribers to make the economics viable.

Consumer Value of Mobile: Will it disappear?

The mobility premium index trend in the USA exhibited a steep decline in the past year: from 20-60x in mid-2016 to about 14-37x in mid-2017 (the range based on data allotment and actual usage). That's about 30-35% reduction. While the per-GB unit pricing differential between mobile and fixed broadband access is likely to continue its downward trend, Mobile Experts believes that the mobile *premium* will be maintained around 10x longer term – whether done explicitly through separate product pricing like it is done today (e.g., smartphone mobile service plans vs. high speed Internet service at home), or implicitly though "all-in-one" connectivity service plans. An "all-in-one" service plan that does not distinguish between mobile vs. fixed access may be priced on a standalone basis by per-device, per-user, or per-household, or the access transport cost may be priced into media content pricing (in a similar manner to today's Pay TV services). There are many ways to price connectivity services. We believe consumers will continue to place a premium on mobile access (for the benefits of on-the-go access), and the unit cost differential between mobile and fixed access will remain sufficiently large enough for this trend to continue.

Cable / Mobile M&A: Will cable acquire mobile, or vice versa?

While it is farfetched to attribute possible cable/mobile mergers and acquisition implications from the *mobility premium* trend and outlook, one can surmise possible reasons for such possibilities.[12] As respective cable and mobile industry players face saturated core markets in Pay TV and smartphone services with rising programming and device costs, it is natural for the players to seek growth through horizontal or vertical mergers in hopes of reducing churn through bundling services and seek cross-sell opportunities through adding on core services that consumers value. In the telecom space, those core services are video, Internet, and mobile (phone) services. The declining - but still large - mobility premium index trend seems to imply that consumers are gradually becoming indifferent about mobile vs. fixed in data-driven access services. In a world where consumers value unlimited access to the Internet at faster speeds (for content, social networks, commerce, etc.), operators need to continuously bring down network costs and opportunistically seek adjacent markets.

[12] In recent months, M&A speculations in the telecom and media sector have been rampant citing possible tie-ups among cable, mobile, and media companies, including Verizon-Dish, Verizon-Charter, Comcast-Verizon, T-Mobile-Sprint, Verizon-Disney, etc.

For mobile operators, this implies that they need to bring down the key cost components of backhaul, siting, and spectrum. Backhaul is one of the major cost contributors of $ per GB unit cost. Leveraging dense cable networks for backhaul as well as terrestrial video and Internet services bring welcome strategic assets to a (standalone) mobile operator, not to mention an immediate cred in Pay TV market with existing content programming deals. For cable operators, merging with a major mobile operator brings an immediate access to owned mobile network, mobile customer relationships, and operational knowhow that is valuable in making an immediate market impact. Mobile Experts believes that a four-player industry structure is not tenable longer term for a highly capital-intensive industry like telecom. It is our opinion that Sprint/T-Mobile will merge at some point, and that Cable/Mobile combination is likely at some point as well as Cable seeks mobile customer relationships, network, and know-how, and Mobile seeks dense terrestrial networks and video business (in some cases).

Conclusions

The telecom industry is going through a major shift as mobile and fixed (cable) operators respond to changing consumer behavior and saturating core markets. Once siloed telecom segments of cable, telco, mobile, and satellite industries are being blurred as consumers increasingly rely on mobile (phone) devices for voice/data/video services. With the freedom of "whenever" and "wherever" Internet access via mobile devices, consumers have always placed a higher value on mobile broadband over fixed access. In our opinion, this *mobility premium* is a good gauge of consumer sentiment towards mobile vs. fixed connectivity services, and arguably a barometer for a fixed-mobile convergence and potential intermodal competition.

Over the course of one year, the *mobility premium* has come down from 60x to 37x (based on data allotment) and 20x to 14x (based on usage) in the U.S. telecom market. While this downward trend seems to suggest a consumer indifference towards mobile vs. fixed access, that is not the case. The 14-37x premium in 2017 (measured based on actual usage and data allotment) is still high to discount the *premium* that exists. Rather, the decline is mostly due to a fierce competition in the mobile industry that significantly drove down the $ per GB pricing – from $9 per GB in 2016 to less than $2 per GB in 2017. Over the next 5 years, we forecast the *mobility premium* to trend down towards 8-19x range.

While 5G economics can offer lower unit costs of delivering each GB, its impact on *mobility premium* is expected to be marginal. A primary reason is that cable operators have economic incentive to protect their fixed broadband market share, and they have robust roadmap to distinguish their fixed broadband offerings with higher speed tiers, and with larger data caps. In other words, while 5G offers a lower unit cost with large swath of millimeter wave spectrum and massive MIMO, the mobility premium will be maintained in a "5G world" five years from now. Mobile Experts forecasts the mobility premium to persist in the 5-10x range longer term as both fixed and mobile broadband networks improve their economics in concert.

Overall, the "bounded" competition stance between mobile and cable operators will remain where both sides see the benefit of not encroaching upon each other's "turf" (i.e., mobile operators' with fixed wireless and cable operators' with MVNO or facilities-based mobile service) too aggressively. Over the longer term, however, we see an eventual merger between cable and mobile operators as consumers will want "unlimited" Internet access – whether the access comes via fixed or mobile networks. The consumer demand for unlimited data access wherever and on whatever device – via fixed and mobile – will drive operators to deliver services over owned facilities to optimize service delivery costs and capabilities.